Docket 87430CPK
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Thomas M. Laney, et al

POLYLACTIC-ACID-BASED SHEET MATERIAL AND METHOD OF MAKING

Serial No. 10/722,887

Filed 26 November 2003

Group Art Unit: 1732

Examiner: Patrick Butler

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

Table Of Contents

APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 19 and 40 which was contained in the Office Action mailed .

A timely Notice of Appeal was filed .

Real Party In Interest

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

Claims 1-40 have been pending in the present application. Claims 19, 21-26, and 29-39 are presently pending in the application. Claims 31-39 have been withdrawn. Claims 1-18, 20, and 27-28 have been canceled. Claims 19, 21-26, 29, 30, and 40 have been finally rejected.

Appendix I provides a clean, double spaced copy of the claims on appeal.

In order to simply and reduce issues, only the rejection of claims 19 and 40 are hereby appealed from.

Status Of Amendments

All claims on appeal have been entered. The last amendment of March 13, 2007, before final rejection, has been entered.

Summary of Claimed Subject Matter

The invention is directed to a method of making a permeable microvoided sheet, which method comprises:

(a) blending void initiating particles into a melt comprising a polylactic-acid-based material, wherein the void initiating particles are employed in an

amount of 30-50% by volume in feedstock for the permeable microvoided sheet prior to extrusion and microvoiding,

(b) extruding said polylactic-acid-based materials as a monolayer film to form a sheet comprising a layer of a polylactic-acid-based material containing inorganic particles; and

(c) stretching the sheet biaxially, in which both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more than 5 times and the area ratio between the non-stretched sheet and the biaxially stretched film is greater than 10 times and not more than 20 times, to form interconnected microvoids around the inorganic particles, thereby obtaining a permeable microvoided sheet that is a monolayer film of polylactic-acid-based material having a total absorbent capacity of at least about 14 cc/m^2.

The claimed method is described on page 3, line 1, to page 4, line 4 of the present application.

Claim 19 further recites that the particles are employed in an amount of 30-50% by volume in feedstock for the permeable microvoided sheet prior to extrusion and microvoiding, as described on page 11, lines 22-24.

The claimed invention recites that, in stretching the sheet biaxially, both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more than 5 times, and the area ratio between the non-stretched sheet and the biaxially stretched film are greater than 10 times and not more than 20 times, to form interconnected microvoids around the inorganic particles, whereas Claim 40 recites that both draw ratios in the longitudinal and transverse directions are at least about 3.3 times to 5 times and the area ratio between the non-stretched sheet and the biaxially stretched film is at least about 11 times and not more than 20 times.

These limitations with respect to the draw ratios are be found in the original specification on page 12, lines 22 to 25, and Example 5 on page 22, in which the stretch ratio in the machine and transverse directions was 3.3, for a total of area ratio of about 11 (to two significant figures).

Grounds of Rejection to be Reviewed on Appeal

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Whether Claims 19 and 40 are anticipated by Morita et al. under 35 U.S.C. 102(b).

2. Whether Claims 19 and 40 are unpatentable under 35 U.S.C. 103(a) over Matsumoto et al. in view of Laney et al.

In order to simply and reduce issues, only the rejection of claim 19 and 40 are appealed from.

Arguments

Claims 19 and 40

Regarding the rejection of claims 19 and 40 as being anticipated by Morita et al. under 35 U.S.C. 102(b), the Applicants respectfully submit that Morita et al. do not disclose, teach, or suggest stretching the claimed sheet biaxially, in which both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more than 5 times (or at least 3.3 times according to claim 40), and the area ratio between the non-stretched sheet and the biaxially stretched film is greater than 10 times (or at least 11 times according to claim 40) and not more than 20 times, to form interconnected microvoids around the inorganic particles, thereby obtaining a permeable microvoided sheet that is a monolayer film of polylactic-acid-based material having a total absorbent capacity of at least about 14 cc/m^2.

Morita et al. fail to disclose a film that has a total absorbent capacity of at least about 14 cc/m^2. Applicants have found that such a film requires biaxial stretching at high loadings of void initiators. The Examples of Morita et al., therefore, fail to meet the limitations of the present claims. It is believed that one reason for this difference is that Morita et al. is directed to a leakproof material that can be used in diapers

and the like, whereas the present invention is directed to a material that can be used in inkjet printing that is rapidly permeable to liquid inks.

The Examiner merely selects from various broad stretching ranges found in Morita et al., using hindsight based on Applicants' own disclosure. The Examiner has failed to point to a single example in Morita et al. that teaches the present invention, compared to actually not teaching the present invention. Obviousness is not based on "might have, though didn't even consider it, but rather obtained something completely different." The Examiner's rejection seems to be that Morita et al. could have accidentally discovered the Applicants' invention while obtaining something else even though Morita et al. didn't want to obtain and wasn't looking for Applicants' invention, but rather something else.

With respect to the rejection of Claims 19, 21-26, 29, 30, and 40 under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. in view of Laney et al., the Examiner alleges that "Since the area ratio between the non-stretched sheet and the biaxially stretched film is a result-effective variable, one of ordinary skill in the art would have obviously been motivated to determine the optimum area ratio between the non-stretched sheet and the biaxially stretched film applied in the process of Matsumoto through routine experimentation based upon reaching increased mechanical strength, which would include the claimed dimensional and area ratios" and "It would have been obvious to use Laney's teaching for using microbeads in the polyester material taught by Matsumoto because of the absorbency properties which efficiently absorb printed inks without the need of multiple processing steps or multiple coated layers....The film would have a total adsorbent capacity of at least about 14 cc/m^2 principally because it is made by the same process as claimed." The Examiner also states, "It would have been obvious to one of ordinary skill at the time of the invention to pick one of the directions to perform stretching in the machine direction first (machine) before the second direction (transverse)."

Laney et al. (hereafter "Laney") is directed to the extrusion of PETG, not PLA, that is, (poly(lactic acid), not poly(ethylene)terephthalate. Aside from the hindsight arguments based essentially on Applicants' own disclosure, the Examiner has overlooked the fact that the comparative data in Table 2 of the present application clearly rebuts the Examiner's allegation. In point of fact, the present application clearly shows in Table 2 that Comparative Example 4 and 5, which are attempts at making the permeable layer of Laney's extruded PETG film as a monolayer, without a base layer, are **not manufacturable**. Furthermore, Laney explicitly teaches that the permeable microvoided sheet comprises both a permeable layer and a base layer integrally extruded (column 2, lines 38-41). Hence, Laney cannot possible teach forming a monolayer of permeable microvoided sheet of polylactic acid. In fact, a fair reading of the teachings of Matsumoto and Laney is that it would be surprising that a monolayer film of polylactic-acid-based material having interconnected microvoids around inorganic particles could be obtained. The microvoids would obviously make it considerably more difficult to extrude as a monolayer, so the fact that Matsumoto can extrude a polylactic-acid-based material that is not microvoided certainly does not suggest, and there is no suggestion otherwise, that one could extrude a polylactic-acid-based material that is microvoided to the extent obtained in the present method. In fact, the prior art teaches the opposite. It is possible to extrude a monolayer of non-microvoided polyester, but that a microvoided layer must be integrated with a microvoided layer to avoid tearing.

As conceded by the Examiner, Matsumoto does not teach blending inorganic particles into a melt comprising polylactic-acid-based material and forming interconnected microvoids. Laney, on the other hand teaches forming microvoids in poly(ethylene terephthalate) polyester to obtain an ink-absorbing material, and says nothing with respect to polylactic-acid-based materials. A key point is that none of the polyesters mentioned by Laney US Patent No. 6,379,780 that were evaluated for the open-cell voided absorbent layer could be produced as a mono-layered film without tearing during manufacturing. That is why Laney US Patent No. 6,379,780 claims a multi-layered film. The present invention is based on the unobvious discovery with a polylactic-acid material that the

inventors were able to manufacture (without tearing) the open-celled absorbent layer as a mono-layered film, which has significant value for inkjet recording media, a product not even contemplated by Matsumoto.

Moreover, Matsumoto would not use Laney's teaching for using microbeads in his polyester material, because Matsumoto teaches against a permeable microvoided monolayer. Matsumoto is interested in making films that are transparent and exhibit a higher tensile stretch. Microvoiding the material would destroy transparency and seriously weaken the tensile strength, which is why any motivation by Matsumoto to microvoid the material is seriously absent. In sum, neither Matsumoto nor Laney, alone or in combination, teach a microvoided monolayer of polylactic-acid-based material and, in fact, teach against it.

The extruded material of the present invention is useful as a material for a porous inkjet receiver in which the open-celled structure would allow for liquid water to be effectively absorbed. Having strived to create such structures for some time, the present inventors have found, after much research and experimentation, that only at inorganic loadings above 60% by weight and with biaxial stretch ratios of greater than 3 can significant absorptive films be attained with polylactic acid. None of the examples presented by Matsumoto et al. have both these requirements of high inorganic loadings and biaxial stretching that are necessary to produce the monolayer film having the requiring permeable microvoiding. In fact, the examples in Matsumoto et al. would have no liquid absorption characteristics, a result that is clearly desired and required by Matsumoto.

It is clear that the Examiner's rationale for combining Matsumoto et al. and Laney et al. selectively picks from each reference only what might in isolation might teach a given feature of the present invention, while ignoring any accompanying feature that teaches against the invention or the combination. Without any coherent rationale for such selective picking and choosing and combining, the rejection is based entirely on hindsight based on Applicants' own disclosure, obtained only after considerable research and development efforts and

expense. The present invention is entirely unpredictable and could have only been obtained by creative experimentation.

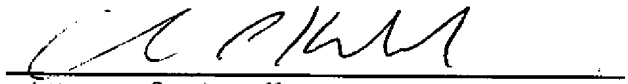
SUMMARY

Claims 19 and 40 are not anticipated by Morita et al. under 35 U.S.C. 102(b), and the subject matter of the claims would not have been obvious of Matsumoto et al. in view of Laney et al. at the time the invention was made.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims .

Respectfully submitted,



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Enclosures
If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Appendix I - Claims on Appeal

Claims 1 to 18 (canceled)

19. (previously presented) A method of making a permeable microvoided sheet, which method comprises:

(a) blending void initiating particles into a melt comprising a polylactic-acid-based material, wherein the void initiating particles are employed in an amount of 30-50% by volume in feedstock for the permeable microvoided sheet prior to extrusion and microvoiding,

(b) extruding said polylactic-acid-based materials as a monolayer film to form a sheet comprising a layer of a polylactic-acid-based material containing inorganic particles; and

(c) stretching the sheet biaxially, in which both draw ratios in the longitudinal and transverse directions are greater than 3 times and not more than 5 times and the area ratio between the non-stretched sheet and the biaxially stretched film is greater than 10 times and not more than 20 times, to form interconnected microvoids around the inorganic particles, thereby obtaining a permeable microvoided sheet that is a monolayer film of polylactic-acid-based material having a total absorbent capacity of at least about 14 cc/m^2.

20. (canceled)

21. (original) The method of claim 19 wherein the permeable microvoided layer is stretched at a temperature of under 75°C.

22. (previously presented) The method of claim 19 wherein the void initiating particles are in the range of 0.1 to 1.0 micrometers in average diameter.

23. (previously presented) The method of claim 22 wherein the void initiating particles are in the range of 0.1 to 0.6 micrometers in average diameter.

24. (original) The method of claim 19 wherein the permeable microvoided layer has a dry thickness of from about 25 to about 400 μm.

25. (previously presented) The method of claim 19 wherein the void initiating particles are inorganic particles that make up from about 45 to about 75 weight % of the total weight of the permeable microvoided layer.

26. (previously presented) The method of claim 25 wherein the inorganic particles are selected from the group consisting of barium sulfate, calcium carbonate, zinc sulfide, zinc oxide, titanium dioxide, silica, alumina, and combinations thereof.

27. (canceled)

28. (canceled)

29. (original) The method of claim 19 wherein the sheet is stretched in both directions simultaneously.

30. (original) The method of claim 19 wherein the sheet is sequentially stretched in a machine direction first followed by a transverse direction.

31. (withdrawn) A single or multilayer sheet comprising a microvoided layer permeable to low surface tension liquids, which microvoided layer comprises a continuous phase comprising a polylactic-acid-based material and interconnecting microvoids, the microvoided layer having a total absorbent capacity of at least about 14 cc/m^2, wherein the microvoided layer comprises void initiating particles in an amount of 30-50% by volume in feedstock for the permeable microvoided sheet prior to extrusion and microvoiding and wherein the microvoided layer is the product of stretching in the longitudinal and transverse directions at a draw ratio in the range of 2 to 5 times such that the area ratio between the non-stretched and the biaxially stretched film is in the range of 9 to 20 times.

32. (withdrawn) The sheet of claim 31 wherein the void initiating particles have a particle size of from about 5 nm to about 15 μm.

33. (withdrawn) The sheet of claim 31 wherein the void initiating particles are in the range of 0.1 to 1.0 micrometers in average diameter.

34. (withdrawn) The sheet of claim 31 wherein said microvoided layer has a dry thickness of from about 25 to about 400 μm.

35. (withdrawn) The sheet of claim 31 wherein the void initiating particles are inorganic particles present in an amount between 50 to 65 weight %.

36. (withdrawn) The sheet of claim 35 wherein the inorganic particles are selected from the group consisting of barium sulfate, calcium carbonate, zinc sulfide, zinc oxide, titanium dioxide, silica, alumina, and combinations thereof.

37. (withdrawn) The sheet of claim 31 wherein the microvoided layer is in a multilayer film and is adjacent to a second layer.

38. (withdrawn) The sheet of claim 37 wherein the second layer comprises a voided or non-voided polylactic-acid-based material and is adjacent to and integral with said microvoided layer.

39. (withdrawn) The sheet of claim 31 wherein the continuous phase comprises additional polymers or blends of other polyesters.

40. (previously presented) The method of claim 19 wherein stretching the sheet biaxially, in which both draw ratios in the longitudinal and transverse directions are at least about 3.3 times and not more than 5 times and the area ratio between the non-stretched sheet and the biaxially stretched film is at least about 11 times and not more than 20 times.

Appendix II - Evidence

None.

Appendix III – Related Proceedings

None.